Week 1: Review of Standard Cosmology and its Problems


Week 2: Inflationary Universe Scenario


Weeks 3 and 4: Theory of Cosmological Perturbations


Weeks 5: Alternatives to Inflation


Week 6: Topological Defects and Structure Formation

* R. Brandenberger, “Topological defects and structure formation,” Int. J.


**Week 7: Cosmic Microwave Background Anisotropies**


* W. Hu and S. Dodelson, “Cosmic Microwave Background Anisotropies”, astro-ph/0110414, up to and including subsection 4.2

* Planck Collaboration, “Planck 2013 results: XVI. Cosmological parameters” arXiv:1303.5076. Supplementary reading for recent observational results. Focus on Fig. 1 and Table 2

**Week 8: Gravitational Waves**

* M. Maggiore, “Gravitational wave experiments and early universe cosmology,” arXiv:gr-qc/9909001; Sec. 1, Sects. 8 - 10 excluding 9.3.


* LIGO Scientific and Virgo and Fermi GBM and INTEGRAL and IceCube and IPN and Insight-Hxmt and ANTARES and Swift and Dark Energy Camera GW-EM and Dark Energy Survey and DLT40 and GRAWITA and Fermi-LAT and ATCA and ASKAP and OzGrav and DWF (Deeper Wider Faster Program) and AST3 and CAASTRO and VINROUGE and MASTER and JGEM and GROWTH and JAGWAR and CaltechNRAO and TTUNRAO and NuSTAR and Pan-STARRS and KU and Nordic Optical Telescope and ePESSTO and GROND and Texas Tech University and TOROS and BOOTES and MWA and CALET and IGI-GW Follow-up and H.E.S.S.

Week 9: Dark Energy


Week 10: Reheating in Inflation

* M. Amin et al, arXiv:1410.3808, Sections 1 - 3

* R. Allahverdi et al, arXiv:1001.2600; Sections 1 - 3 (with emphasis on 3).

Week 11: Inflation in String Theory


Weeks 12: Quantum Field Theory Methods in Cosmology

* R. Brandenberger, ”Quantum field theory methods and inflationary universe models”, Rev. Mod. Phys. 57, 1 (1985); Sections II - IV (Effective potential,
finite temperature field theory, bubble nucleation).